Contralateral Nostril acts as Conduit for Nasotracheal Tube Exchange under Fiberbronchoscope Guidance

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Citation

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Abstract

Purpose: Fiberoptic bronchoscopy aids in direct visualization of the airway and can provide visual guidance for exchange of nasotracheal tubes intraoperatively in head and neck surgeries where the full access for direct laryngoscopy and other airway manipulations will interfere and infect the exposed surgical field.
Clinical Features: A 54-year-old male patient was planned for central arch resection with plate and myocutaneous flap reconstruction. After induction of anesthesia, fiberbronchoscope size 4. 9 mm was passed through the left nostril and after confirmed visualization of carina, reinforced cuffed tracheal tube size 7.5 mm inner diameter was threaded over it. At the beginning of reconstructive phase of surgery, air leak was heard with suspected tracheal tube cuff damage. For tube exchange under direct visualization, the bronchoscope, loaded with new reinforced cuffed tracheal tube size 7.5 mm, was passed through the right nostril. The bronchoscope was passed between the anterior commissure and the outer surface of the damaged tracheal tube. As the cuff was already damaged and lying collapsed, the fiberbronchoscope easily slid along the outer surface of the damaged tracheal tube and reached carina. After confirmation of the visualization of carina, the damaged tracheal tube was withdrawn through the left nostril leaving the bronchoscope endotracheal in situ; and immediately afterwards the new tracheal tube was passed to reintubate trachea within ten seconds.
Conclusions: This technique is effective and smooth as this two-minutes-technique underwent under direct visualization with little difficulty and less than ten seconds interruption in mechanical ventilation during the actual tube exchange.

IMPLICATIONS STATEMENT

Endotracheal tube exchange is a risky procedure and fiberoptic bronchoscopy guidance per contralateral nostril is better alternative to airway exchange catheter for nasotracheal tube exchange.

INTRODUCTION

Intraoperative endotracheal tube exchange in head and neck cancer surgeries is a tricky clinical scenario which has always been a major concern for anesthesiologists. Fiberoptic bronchoscopy aids in direct visualization of the airway and can provide visual guidance during the exchange. Oral endotracheal tube exchange has been documented using laryngeal mask airway [1, 2]. However, this is not possible for nasotracheal tube exchange. The following case report highlights the use of contralateral nostril for the nasotracheal tube exchange under bronchoscopic guidance.

CASE DESCRIPTION

A 54-year-old-50-kg male patient presented with squamous cell carcinoma lower alveolus (central arch). The tumor was 4cm by 3cm ulcero-infiltrative growth extending from canine tooth to contralateral canine tooth with presence of bony invasion. It was involving the adjacent floor of mouth and extending into submental space. An abscess was present in submental space with necrosis of overlying skin. There was bilateral cervical node involvement. He was planned for central arch resection with plate reconstruction with right sided modified neck dissection type-II with left sided modified neck dissection type-I with bipaddle pectoralis major myocutaneous flap reconstruction.

On the pre-anesthetic examination, the patient was ASA physical status grade 1. His airway examination revealed missing lower incisors teeth and Mallampatti Grade II status. The patient was advised nil by mouth overnight and diazepam 5mg oral was given in the night. On the morning of surgery, xylometazoline nasal drops were instilled in both nostrils to facilitate elective nasotracheal intubation. Morphine 5mg, promethazine 25mg and glycopyrrolate 0.2mg as intramuscular premedication was given thirty minutes before shifting the patient to the operating room.

After pre-oxygenation for three minutes, patient was given morphine 3mg and propofol 120mg intravenously for induction of anesthesia, and vecuronium bromide 8mg for facilitation of tracheal intubation. Fiberoptic bronchoscopy was performed through the left nostril using Olympus (Hamburg, Germany) BF-PE2 fibrebronchoscope size 4. 9 mm and channel 2.2 mm. Rusch Flex (Kamunting, Malaysia) reinforced cuffed tracheal tube size 7.5 mm inner diameter was threaded over the fibrebronchoscope after visualizing carina and tracheal tube was fixed at 27 cm mark. After confirmation with the end-tidal carbon dioxide monitor, tracheal tube was connected to anesthesia ventilator. The nitrous oxide to oxygen administration ratio was 67:33. The only positive finding during bronchoscopy was the prominent nasal turbinates. The oropharyngeal cavity was packed with sterile throat pack to prevent aspiration of blood and oral secretions.

The surgery was initiated with patient positioned in hyperextension at neck, chin lifted and pillow under the shoulder blades. The primary tumor was dissected and removed en-masse. At the beginning of reconstructive phase of surgery, air leak was heard and observed through the gurgling sounds from throat packing. Hoping it to be a minor leak, the tracheal tube cuff was reinflated with air; however, the pilot balloon rapidly collapsed after reinflation indicating the complete rupture of the cuff. It was decided to change the naso-tracheal tube with the help of fibrebronchoscope.

Firstly, the inspired oxygen concentration was increased to 100% and adequate muscle relaxation was maintained. The oropharyngeal pack was removed to give the space for airway manipulations, and thorough oropharyngeal suctioning was performed to prevent tracheobronchial aspiration during the manipulations. The bronchoscope, loaded with new reinforced cuffed tracheal tube size 7.5 mm, was passed through the right nostril. The damaged tracheal tube that was threaded through left nostril was still in situ and mechanical ventilation was maintained with higher tidal volumes and higher total gas flows compensating for the air leak. The bronchoscope was passed between the anterior commissure and the outer surface of the damaged tracheal tube. As the cuff was already damaged and lying collapsed, the bronchoscope easily slid along the outer surface of the damaged tracheal tube and reached carina. After confirmation of the visualization of carina and railroading the new tracheal tube through right nostril to lie in the oropharynx, the damaged tracheal tube was withdrawn through the left nostril leaving the bronchoscope endotracheal in situ; and immediately afterwards the new tracheal tube was passed to reintubate trachea within ten seconds and anesthesia ventilator was connected to the new nasotracheal tube. The remaining peri-operative period was uneventful.

DISCUSSION

Endotracheal tube exchange is a risky procedure [3,4,5] and the number of techniques for ETT exchange is limited [1,2,3,4,5,6,7]. In our patient, it was decided to change the naso-tracheal tube with the help of fibrebronchoscope under direct visualization as surgical field was open with central arch of mandible removed en-masse and airway exchange catheter with or without direct laryngoscopy was not possible without soiling the tracheobronchial tree with blood and secretions.

Based on the accessed web-data related to the approximation of glottic size[8], it was possible to slide bronchoscope down the trachea in our patient with an in situ faulty tracheal tube. Based on the Absolute length of glottic opening and width of glottic opening being 11.5±4.0mm and 16.3±5.7mm respectively in males, it would have been more spacious to slide bronchoscope lateral to the faulty tube instead of anterior to the faulty tube. However, enough space was available anterior to faulty tube size 7.5mm inner diameter and 10.3mm outer diameter to allow bronchoscope size 4.9mm outer diameter. Also, it was intended to avoid the entanglement and dragging of laterally placed in-situ bronchoscope while withdrawing the faulty tracheal tube.

In summary, the use of contralateral nostril for the nasotracheal tube exchange under bronchoscopic guidance provides the answer to the difficult clinical scenario for exchange of nasotracheal tubes intraoperatively in head and neck surgeries where the full access for direct laryngoscopy and other airway manipulations will interfere and infect the exposed surgical field. This technique is effective and smooth as this two-minutes-technique underwent under direct visualization with little difficulty and less than ten seconds interruption in mechanical ventilation during the actual tube exchange.

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